

**WHAT IS CLAIMED IS:**

1           1. An apparatus for positioning a mobile station in a  
2   TDMA communication system, comprising:  
3           a plurality of power detectors, respectively located  
4   in a plurality of predetermined positions, for respectively  
5   measuring a plurality of power values of the signal  
6   generated by the mobile station in a preset channel and a  
7   preset time slot; and  
8           at least one controller, coupled to the power  
9   detectors, for identifying the mobile station according to  
10   the preset channel and the preset time slot, and determining  
11   the position of the mobile station according to at least one  
12   of the measured power values and the position of the  
13   corresponding detector.

1           2. The apparatus of Claim 1, wherein the at least one  
2   controller is located on a base station of the TDMA  
3   communication system.

1           3. The apparatus of Claim 1, wherein the at least one  
2   controller determines the position of the mobile station  
3   according to the position of the detector that has the  
4   maximum power value among the plurality of power values  
5   measured by the plurality of power detectors.

1           4. The apparatus of Claim 1, wherein the at least one  
2   controller determines the position of the mobile station  
3   according to a three-point positioning technique using the  
4   power values measured by at least three of the plurality of

5 power detectors and the positions of the corresponding at  
6 least three power detectors.

1 5. The apparatus of Claim 4, wherein the power values  
2 measured by the plurality of power detectors are corrected  
3 by a predetermined weight according to their relative  
4 position to an obstacle.

1 6. The apparatus of Claim 1, wherein the at least one  
2 controller further includes a look-up table recording the  
3 relationship between all known positions of the mobile  
4 station and the measured power values for each power  
5 detector corresponding to each location, wherein the  
6 position of the mobile station is determined by comparing  
7 the look-up table with the plurality of power values  
8 measured by the plurality of power detectors.

1 7. The apparatus of Claim 1, wherein the plurality of  
2 power detectors are connected to the at least one controller  
3 by a wireless path.  
4

5 8. The apparatus of Claim 1, wherein the plurality of  
6 power detectors perform the power measurement by using the  
7 communication signal between the mobile station and a base  
8 station of the TDMA communication system.  
9

10 9. The apparatus of Claim 1, wherein the plurality of  
11 power detectors perform the power measurement by using the  
12 response signal from the mobile station when a base station  
13 of the TDMA communication system pages the mobile station.

14           10. The apparatus of Claim 1, wherein the at least one  
15 controller further transfers a time slot message signal to  
16 the plurality of power detectors for synchronizing the power  
17 measurement by the plurality of power detectors with the  
18 time slots allocated by the TDMA communication system.

1           11. The apparatus of Claim 1, wherein the power  
2 detectors are RF receivers for directly measuring the RF  
3 power.

1           12. A method of positioning a mobile station in a TDMA  
2 communication system, comprising the steps:

3           providing a plurality of power detectors respectively  
4 located at a plurality of predetermined positions;

5           respectively measuring a plurality of power values of  
6 the signal generated by the mobile station in a preset  
7 channel and a preset time slot;

8           identifying the mobile station according to the  
9 preset channel and the preset time slot; and

10          determining the position of the mobile station  
11 according to at least one of the measured power values and  
12 the position of the corresponding detector.

1           13. The processing method of Claim 12, wherein in the  
2 step of determining the position of the mobile station, the  
3 position of the mobile station is determined according to  
4 the position of the detector that has the maximum power  
5 value among the plurality of power values measured by the  
6 plurality of power detectors.  
7

8 14. The processing method of Claim 12, wherein in the  
9 step of determining the position of the mobile station, the  
10 position of the mobile station is determined according to a  
11 three-point positioning technique using the power values  
12 measured by at least three of the plurality of power  
13 detectors and the positions of the corresponding at least  
14 three power detectors.

1 15. The processing method of Claim 14, wherein the  
2 power values measured by the plurality of power detectors  
3 are corrected by a predetermined weight according to their  
4 relative position to an obstacle.

1 16. The processing method of Claim 12, wherein in the  
2 step of determining the position of the mobile station,  
3 further comprising the steps:

4 providing a look-up table recording the  
5 relationship between all known positions of the mobile  
6 station and the measured power values for each power  
7 detector corresponding to each location; and

8 determining the position of the mobile station by  
9 comparing the look-up table with the plurality of power  
10 values measured by the plurality of power detectors.

1 17. The processing method of Claim 12, wherein in the  
2 step of measuring a plurality of power values of a signal  
3 generated by the mobile station, the plurality of power  
4 detectors perform the power measurement using the  
5 communication signal between the mobile station and a base  
6 station of the TDMA communication system.

1           18. The processing method of Claim 12, wherein in the  
2 step of measuring a plurality of power values of a signal  
3 generated by the mobile station further comprises the steps:  
4           paging the mobile station from a base station of the  
5 TDMA communication system; and  
6           performing the power measurement by using the  
7 response signal from the mobile station paged.